Supplementary Data

METHODS

Inclusion and Exclusion Criteria

Table 1 shows the inclusion and exclusion criteria set for the literature search, which determined relevant articles for this systematic review.

Table 1 *Inclusion and exclusion criteria adhered to in search*

	Inclusion Criteria	Exclusion Criteria
Population	Studies eligible for inclusion for this review were: • Studies in humans • Children (aged ≤ 18 years) • Children who are overweight or obese	Studies were excluded for this review, if they were: • Studies in adults (aged ≥ 18 years) • Studies involving children that are not overweight or obese • Studies in animals or non-human models
Intervention	People who have taken ibuprofen via age-band dose or alternative dosing method, for example: • ABW - adjusted body weight • BMI - body mass index • IBW - ideal body weight • LBW - lean body weight	None.
Comparison	People who have taken ibuprofen using mg/kg basis or age-band dose calculation	None.
Outcome	Primary Outcome: • The efficacy of ibuprofen treatment in obese children Secondary Outcomes: • Presence of an adverse events (e.g. rash, rectal haemorrhage, acute kidney injury) • Tolerability of ibuprofen in obese children	Outcomes in adults (aged >18 years)
Setting	Primary Care, General Practice Secondary Care, Hospital Admission	None.
Study Design	Primary evidence research	Studies with no full-text available Reviews, editorials or letters

Quality Assessment

Papers were quality assessed using the Critical Appraisal Skills Programme (CASP) checklists independently by two reviewers (10), generating a quality assessment score (*QAS*). This comprised 12 questions regarding the validity of results, how bias was minimised and the implications of the results (see Table 2). Papers scored a point for an answer of "Yes" for questions in Section A and Section C of the quality evaluation. All points were then totalled. Due to differences in study designs, some questions were not applicable, and this was recorded. To allow for comparisons amongst the papers, the *QAS* was given as a percentage. The two reviewers discussed any discrepancies in the *QAS* and collectively came to a decision.

RESULTS

Flow of Articles

From the initial 1305 retrieved articles, after screening the articles based on their titles and abstracts, 1279 entries were deemed irrelevant, thus identifying 26 papers for a detailed full-text review. Of these, 4 met the study inclusion criteria (3 retrospective cohort studies and 1 case report).

Articles were excluded for the following reasons: not overweight/obese (*n*=9, participants in the study did not have weight recorded or were not classified as overweight or obese), did not take ibuprofen (*n*=5, participants had not consumed ibuprofen), and not primary evidence (*n*=8, study was not original research e.g. a review, editorial or letter).

Quality Assessment

To assess quality, papers were scored against a set of 12 questions (see supplementary data Table 2 for full quality assessment details). Overall 3 out of the 4 studies exhibited high methodological quality. The sample size for one paper was unclear as they had collated information from other sources. All studies addressed a clearly focussed issue, appropriately recruited samples and identified important confounding factors, of which 3 had taken these into account in the study design. For the three retrospective cohort studies, all had a sufficiently long follow-up period, however one paper did not have a complete enough follow-up period. Two papers were not deemed to be generalisable to the local population. Results of all four studies was consistent with current literature.

Table 2 *Quality evaluation of selected papers using CASP checklist and corresponding Quality Assessment Score (QAS)* (10). *N/A=not applicable*

Paper No.:	1	2	3	4
Title:	Outcomes of an Alternating Ibuprofen and Acetaminophen Regimen for Pain Relief After Tonsillectomy in Children.	Inconsistencies in dosage practice in children with overweight or obesity: A retrospective cohort study	Antipyretic Efficacy of Acetaminophen and Ibuprofen in Critically Ill Paediatric Patients	Development of recommendations for dosing of commonly prescribed medications in critically ill obese children
Did the study address a clearly focused issue?	Yes	Yes	Yes	Yes
Was the cohort recruited in an acceptable way?	Yes	Yes	Yes	Yes
Was the exposure accurately measured to minimise bias?	Yes	Yes	Yes	N/A
Was the outcome accurately measured to minimise bias?	Yes	Yes	Yes	N/A
Have the authors identified all important confounding factors?	Yes	Yes	Yes	Yes

Have they taken account of the confounding factors in the design and/or analysis?	Yes	Yes	Yes	No
Was the follow up of subjects complete enough?	Yes	No	Yes	N/A
Was the follow up of subjects long enough?	Yes	Yes	Yes	N/A
What are the results of this study?	Study found that age, sex, obesity, amongst other factors were not different between children who had adequate pain control and children who experienced unresolved pain.	Study states that ibuprofen has not been investigated in overweight or obese children. Due to the common adverse events, extrapolating adult dosages is not recommended.	Critically ill paediatric patients with fever were more likely to defervesce with enteral ibuprofen, but had a shorter time to defervescence with IV paracetamol. Patient age, presence of obesity, baseline temperature influence efficacy of antipyretic medications	Study developed a dosing weight recommendation tool based on variety of available data for use in critically obese children. Ibuprofen dosages were based on adjusted body-weight (co-factor of 0.4).
How precise are the results?	Very	Unclear	Very	Unclear
Do you believe the results?	Yes	Yes	Yes	No
Can the results be applied to the local population?	Yes	No	Yes	No

Do the results of this study fit with other available evidence?	Yes	Yes	Yes	Yes
What are the implications of this study for practice?	Study offers new recommended method of providing effective analgesia in children post-tonsillectomy.	Study highlights the limited evidence available regarding dosing guidelines in overweight or obese children.	Study highlights antipyretic efficacy of paracetamol (IV, enteral, rectal) and ibuprofen (enteral) in critically ill febrile paediatric patients	Study offers a dosing weight recommendation tool for use in critically obese children.
QAS:	100%	80%	100%	67%